



PATENT SPECIFICATION

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523,104

PROVISIONAL SPECIFICATION

No. 37396, A.D. 1938.

Improvements in and relating to Nozzles for Hoses and the like

We, BYSON APPLIANCE COMPANY LIMITED, a British Company, of Woolfold, Bury, Lancashire, and ERNEST HARRISON, a British subject, of the said Company's address, do hereby declare the nature of this invention to be as follows:—

This invention relates to nozzles for fire-hoses and the like such as the hoses used by fire-brigades, and is concerned with providing improvements in the nozzles themselves and in the means for securing them to the hose.

One of the objects of the invention, is to provide a nozzle which will eject a solid column of water, unbroken by air bubbles at its commencement, and to achieve this end the nozzle, according to this invention, is formed with its final outlet passage parallel or slightly tapered, and at the inner end of such passage, within the nozzle, the internal diameter increases suddenly so as to form a sharp shoulder. Such shoulder may be in a plane at right-angles to the axis of the nozzle, and thereby exert a direct thrust on the out-going fluid, or may be backed-off, or undercut so as to present a sharper cutting edge to the out-going fluid. It is believed that with a shoulder of this type, small bubbles of air in the hose, as the water reaches the nozzle outlet, are held back by the shoulder, until they have collected together sufficiently to overflow into the outlet passage, whereby the water issuing from the nozzle is much more regular and unbroken than is the case with nozzles hitherto known.

On its outer-most end, the nozzle may be flat, with a right-angled corner around the outlet opening, or it may have the orifice counter-sunk on the outer end as in known manner.

According to a further feature of the invention the improved nozzle has a body part made of a moulded plastic material such as a synthetic resin, preferably a rag-filled or light strengthened material, to which body part is attached an outlet orifice member in the form of a metal bush extending through the outlet passage and over the outer end of the nozzle. The

shoulder formed within the nozzle as above described may be formed in the moulded body part, or may be comprised by the inner end of the metal insert. Such metal insert may be moulded in position, or may be adapted for interchangeability with others of different size, and in this last connection there may be a metal nut moulded in the nozzle, into or on to which the interchangeable orifice member can be screwed.

The improved nozzle may be provided with vanes extending within it, to direct the out-flowing water and prevent rotation of the water, which vanes may be formed integrally with the metal nose piece, or orifice member, or may be connected thereto, or may be integral with the moulded body.

The attachable metal orifice member, fitting over the nose of the body part and extending into the outlet passage, may screw on to or into a ring carrying the vanes, so that each will hold the other in position with the body part gripped between them.

Another object of the invention, is to improve the means for connecting the nozzles to the ends of the hose, and this comprises a multi-start quick thread on the exterior of the rear end of the body part of the nozzle, over which the end of the hose is placed and a collar is then screwed on to grip the hose, the size and pitch of the threads being such as not to damage the hose.

In one example of the invention the improved nozzle is made of a moulded filled material, and is provided with a parallel-walled cylindrical final outlet $\frac{3}{16}$ " in diameter, and about 1" long, counter-sunk at its outer end, and on its inner end presenting a flat shoulder or face about $\frac{1}{16}$ " deep, the remaining interior part of the nozzle tapering to a larger diameter from the said shoulder.

Dated this 19th day of December, 1938.

For the Applicants,

WILSON, GUNN & ELLIS,

Chartered Patent Agents,

54/56, Market Street, Manchester, 1.

[Price 1/-]

BEST AVAILABLE COPY

PROVISIONAL SPECIFICATION

No. 2696, A.D. 1939.

Improvements in and relating to Nozzles for Hoses and the like

We, BYSON APPLIANCE COMPANY LIMITED, a British Company, of Woolfold, Bury, Lancashire, and ERNEST HARRISON, a British Subject, of the said Company's address, do hereby declare the nature of this invention to be as follows:—

This invention relates to nozzles for fire-hoses and the like, such as the hoses used by fire-brigades, and consists of improvements in or developments of the invention forming the subject of our co-pending application for Patent No. 37396/38 (Serial No. 523,104).

According to that earlier application, the nozzles were characterised by having a sharp shoulder within them at the rear end of the final outlet, such shoulder being formed by an increase of internal diameter.

According to the present invention, existing nozzles are modified to incorpo-

ate the said earlier invention, or new nozzles are formed, by being bored to a large diameter at the outlet, and by having a bush secured therein, in such a way that the innermost end face of the bush constitutes the aforesaid sharp shoulder.

The attached bushes may be screwed into or on to the nozzles, or be sweated in position, or the nozzles may be shrunk on to the bushes, or any other suitable connecting means may be adopted.

The bushes may be of the same material as the body of the nozzles, or of a harder or a softer material, as may be desired, and may be shaped to fit over the extremity of the nozzle.

Dated this 24th day of January, 1939.

For the Applicants,

WILSON, GUNN & ELLIS,

Chartered Patent Agents,

54/56, Market Street, Manchester, 1.

COMPLETE SPECIFICATION

Improvements in and relating to Nozzles for Hoses and the like

We, BYSON APPLIANCE COMPANY LIMITED, a British Company, of Woolfold, Bury, Lancashire, and ERNEST HARRISON, a British subject, of the said Company's address, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to nozzles for fire-hoses and the like, such as the hoses used by fire-brigades, and is concerned with providing improvements in the nozzles themselves and in the means for securing them to the hose.

One of the objects of the invention is to provide a nozzle which will eject a solid column of water, unbroken by air bubbles at its commencement, and to achieve this end the nozzle, according to this invention, is formed with its final outlet passage parallel or slightly tapered, and at the inner end of such passage, within the nozzle, the internal diameter increases suddenly so as to form a sharp shoulder. Such shoulder may be in a plane at right-angles to the axis of the nozzle, and thereby exert a direct thrust on the outgoing fluid, or may be backed-off or undercut so as to present a sharper cutting edge to the outgoing fluid. It is believed that with a shoulder of this type, small bubbles

of air in the hose, as the water reaches the nozzle outlet, are held back by the shoulder, until they have collected together sufficiently to overflow into the outlet passage, whereby the water issuing from the nozzle is much more regular and unbroken than is the case with nozzles hitherto known.

On its outermost end, the nozzle may be flat, with a right-angled corner around the outlet opening, or it may have the orifice counter-sunk on the outer end as in known manner.

Nozzles according to this invention may be made in a single piece, or in two parts, the body in the latter case having an inserted bush at the outlet to form the shoulder, and further existing nozzles may be modified to incorporate the invention by being bored to a larger diameter at the outlet, and by having a bush secured therein in such a way that the innermost end face of the bush constitutes the aforesaid sharp shoulder.

The attached bushes may be screwed into or on to the nozzles, or may be sweated in position, or the nozzles may be shrunk on to the bushes, or any other suitable connecting means may be adopted.

The bushes may be of the same material as the body of the nozzles, or of a harder or a softer material, as may be desired.

and may be shaped to fit over the extremity of the nozzles.

According to a further feature of the invention the improved nozzle has a body part made of a moulded plastic material such as a synthetic resin, preferably a rag-filled or like strengthened material, to which body part is attached an outlet orifice member in the form of a metal bush extending through the outlet passage and over the outer end of the nozzle. The shoulder formed within the nozzle as above described may be formed in the moulded body part, or may be comprised by the inner end of the metal insert. Such metal insert may be moulded in position, or may be adapted for interchangeability with others of different size, and in this last connection there may be a metal nut moulded in the nozzle, into or on to which the interchangeable orifice member can be screwed.

The improved nozzle may be provided with vanes extending within it, to direct the out-flowing water and prevent rotation of the water, which vanes may be formed integrally with the metal nose piece, or orifice member, or may be connected thereto, or may be integral with the moulded body.

The attachable metal orifice member, fitting over the nose of the body part and extending into the outlet passage, may screw on to or into a ring carrying the vanes, so that each will hold the other in position with the body part gripped between them.

Another object of the invention is to improve the means for connecting the nozzles to the ends of the hose, and this comprises a multi-start quick thread on the exterior of the rear end of the body part of the nozzle, over which the end of the hose is placed, and a collar is then screwed on to grip the hose, the size and pitch of the threads being such as not to damage the hose.

The accompanying drawing illustrates several examples of the invention:—

Fig. 1 is a half-sectional elevation of a nozzle with an intermoulded outlet orifice member;

Fig. 2 is a sectional view of one half of a nozzle with an inserted outlet orifice member;

Fig. 3 is a like view to Fig. 2, but showing a modified form of inserted orifice member;

Fig. 4 is a part-sectional elevation of a one-piece nozzle and also shows one form of the hose-securing means.

Referring to Fig. 1 of the drawings, the nozzle shown comprises a body part *a* formed of a plastic moulded material such as a filled resin, and an intermoulded metal

bush *b* at the outlet, such bush forming a shoulder *c* within the nozzle, and having an external flange *d* to protect the end of the moulding. Except for the flanged part *d* the bush lies wholly within the body part. In order to key the bush *b* in position it is stepped on the outer surface, as by the flange *e*. Such stepping may however take other forms, or a tapered formation may be adopted instead. The outer end of the central bore of the bush *b* is slightly bevelled. In this form of the invention the inner face of the body part *a* is a plain tapering wall converging towards the shoulder *c*. As above stated, the shoulder *c* may be undercut so as to present a knife edge to the out-flowing liquid at the entrance of the bush *b*.

Referring to Fig. 2 the moulded body-part *a* has integral interior webs or fins *f* intended to prevent rotation of the water as it passes through the nozzle, and these fins terminate at the shoulder *c* and do not extend above the inner wall of the bush *b*. The nozzle shown will have four equally-spaced fins, but other numbers and arrangements may be adopted in lieu of that shown. The fins *f* are of rectangular section, as indicated by the dotted lines at *g*.

In this example also, the bush *b* is not itself moulded in the body *a*, but screws into an intermoulded nut *h*, which nut will have a non-circular periphery so as to be keyed against rotation.

Fig. 3 shows an alternative wherein the fins *f*, instead of being integral with the body *a* are formed on a metal shell *i* the forward end of which constitutes a nut to receive the bush *b*. As shown the shell *i* has a rear flange *j*, but in other cases the ribs *f* could extend separately from a ring or collar growing out of the screwed forward end.

The nozzles appearing in Figs. 1 to 3 are formed at the rear end with a shoulder or collar *k* to fit a socket (not shown) having retractable pawls, in known manner.

The nozzle shown in Fig. 4 is a one-piece nozzle, either a plastic moulding, or a metal article, and has the shoulder *c* formed by casting or machining or both. This Figure also shows the improved means for securing a hose to the nozzle, such means comprising the multi-start screw thread *l*, with broad rounded teeth such as will not cut the hose, and an outer collar or nut *m*, this latter being arranged to trap the end of the hose between the bevelled meeting faces of the nut *m* and the body *a*.

With nozzles made according to this invention a solid rod-like stream of water is obtained, with little surface breakage.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A nozzle for fire hose and the like whose inner bore at the outlet end is parallel or substantially parallel, is of smaller diameter than at the preceding parts, and joins the preceding parts in a step or shoulder facing the outflowing liquid.

2. A nozzle according to claim 1 wherein the step or shoulder is undercut and presents a knife-edge to the outflowing liquid immediately around the smaller diameter part of the bore.

3. A nozzle for fire hose and the like comprising a body part of a moulded plastic material and an outlet part of metal moulded into the body part, the said outlet part having a parallel-sided or substantially parallel-sided bore, and the inner end of the outlet part forming a step or shoulder facing the outflowing liquid.

4. A nozzle according to claim 3 wherein the outlet part lies wholly within the body part except for a flange covering the end face of the body part.

5. A nozzle according to claim 3 or 4 wherein the bush is flanged or otherwise raised on its outer surface so as to be keyed in the moulded body part.

6. A nozzle for a fire hose or the like comprising a moulded body part, a nut moulded into or otherwise secured in the body part at the outlet end, and a metal

bush screwing into that nut, such bush having its bore parallel-sided or substantially so, and the inner end of the bush forming a step or shoulder facing the outflowing liquid.

7. A nozzle according to any of the preceding claims having vanes on its interior (except at the final outlet) to prevent rotation of the ejected liquid.

8. A nozzle according to any of claims 3 to 6 having vanes moulded on the inner bore of the body part to prevent rotation of the ejected liquid, such vanes extending inwardly to a diameter equal to that of the final outlet orifice.

9. A nozzle according to claim 6, wherein the nut is connected to vanes for preventing rotation of the ejected liquid.

10. A nozzle according to any of the preceding claims having a multi-start thread on its exterior at the rear and a nut therefor adapted to secure the nozzle to a hose pipe as set forth.

11. A nozzle according to claim 1, made by boring out the final outlet to a larger size and inserting a bush therein, the inner end of the bush forming the step or shoulder.

12. A nozzle for fire hose having its interior shaped as herein described with reference to any of the Figures of the accompanying drawing.

Dated this 18th day of December, 1939.

For the Applicants,

WILSON, GUNN & ELLIS,

Chartered Patent Agents,

54/56, Market Street, Manchester, 1.

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